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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/973,009	10/10/2001	Eisaku Ito	214806US3	4757

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EXAMINER

KERSHTEYN, IGOR

ART UNIT

PAPER NUMBER

3745

DATE MAILED: 12/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/973,009

Applicant(s)

ITO ET AL.

Examiner

Igor Kershteyn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 10/27/03 have been fully considered but they are not persuasive.

Claims 1 and 2 have been amended. The new claim 5 has been added.

Applicant generally states that "Sato et al. does not disclose a wide turning angle of more than 120 degrees" and the Examiner concurs, but in the specification, in page 2, lines 23-24, the Applicant states "To increase the work deltaH of each blade in each stage it is required to increase the blade turning angle delta alpha" and thus the Applicant admits that the technique of increasing the turning angle is known in the art as shown above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (4,626,174) in view of Applicant's Admitted Prior Art.

Sato et al., in figures 1, 2, 5, and 10-14, teach a blade 10, of a gas turbine, having a belly side 10b, a back side 10a, a front edge (not numbered), and a rear edge (not numbered), the blade 10 comprising a wide turning angle of 120 degrees, wherein

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diameters of circles inscribing the belly side 10b and the back side 10a of adjacent blades decrease gradually from the front edge to the rear edge.

Note. Even though Sato et al. does not disclose inscribed circles, but rather shows radiuses S1 and S2, the concept of determining the distance between the blades is considered indifferent from Applicants'.

Sato et al. does not disclose the blade comprising a turning angle greater than 120 degrees.

Applicant, in his Admitted Prior Art, teaches increasing the turning angle.

Since Sato et al. and Applicants' Admitted Prior Art (AAPA) are analogous art because they are from the same field of endeavor, that is the turbine blade art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to increase the turning angle of Sato et al. to more than 120 degrees as taught by Applicant Admitted Prior Art for the purpose of increasing work deltaH.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (4,626,174) as modified by Applicant Admitted Prior Art, and further in view of obvious design choice.

Sato et al. as modified by AAPA, disclose all the claimed subject matter.

Sato et al. as modified by AAPA, do not disclose expressly a ratio of blade maximum wall thickness and blade chordal length is 0.15 or more, and a wedge angle of the rear edge is 10 degrees or less.

Since applicant has not disclosed that having a ratio of blade maximum wall thickness and blade chordal length is 0.15 or more, and a wedge angle of

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the rear edge is 10 degrees or less solves any stated problem or is for any particular purpose above the fact that the blade profile reduces the flow velocity differential across the blade and it appears that the blade of Sato et al. would perform equally well with a shape and having the dimensions as claimed by applicant, it would have been an obvious matter of design choice to modify blade of Sato et al. by utilizing a ratio of blade maximum wall thickness and blade chordal length is 0.15 or more, and a wedge angle of the rear edge is 10 degrees or less as claimed for the purpose of reducing the flow velocity differential across the blade.

Therefore, it would have been an obvious matter of design choice to modify the turbine of Sato et al. as modified by AAPA, to obtain the invention as specified in claim 2.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (4,626,174) as modified by AAPA, in view of Shizuya et al.(4,786,233)., and further in a view of obvious design choice.

Sato et al. as modified by AAPA teach all the claimed subject matter except that he doesn't teach the blade.

Shizuya et al. in figures 1 and 2, teach a turbine blade 2 being a cooling blade of which cooling passage 15 is near the rear edge 14.

Since Sato et al. as modified by AAPA and Shizuya et al. are analogous art because they are from the same field of endeavor, that is the turbine blade art, it would

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have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the turbine blade of Sato et al. as modified by AAPA with the cooling passage at the rear edge as taught by Shizuya et al. for the purpose of reducing thermal expansion and stress in the turbine blade.

Sato et al. as modified by AAPA and as further modified by Shizuya et al. does not disclose expressly the ratio of wall thickness of rear edge and throat between adjacent blades is 0.15 or less.

Since applicant has not disclosed that having the ratio of wall thickness of rear edge and throat between adjacent blades is 0.15 or less solves any stated problem or is for any particular purpose above the fact that the blade profile reduces the flow velocity differential across the blade and it appears that the blade of Sato et al. as modified by Shizuya et al. would perform equally well with the ratio of wall thickness of rear edge and throat between adjacent blades is 0.15 or less as claimed by applicant, it would have been an obvious matter of design choice to modify the blade of Sato et al. as modified by Shizuya et al. by utilizing the specific shape and dimensions as claimed for the purpose of reducing the flow velocity differential across the blade.

Therefore, it would have been an obvious matter of design choice to modify the turbine blade of Sato et al. as modified by AAPA and as further modified by Shizuya et al. to obtain the invention as specified in claim 3.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (4,626,174) as modified by AAPA, in view of Shizuya et al.(4,786,233)., and further in a view of obvious design choice.

Sato et al. as modified by AAPA teach all the claimed subject matter except that he doesn't teach the blade.

Shizuya et al. in figures 1 and 2, teach a turbine blade 2 being a cooling blade of which cooling passage 15 is near the rear edge 14.

Since Sato et al. as modified by AAPA and Shizuya et al. are analogous art because they are from the same field of endeavor, that is the turbine blade art, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the turbine blade of Sato et al. as modified by AAPA with the cooling passage at the rear edge as taught by Shizuya et al. for the purpose of reducing thermal expansion and stress in the turbine blade.

Sato et al. as modified by AAPA and as further modified by Shizuya et al. does not disclose expressly the ratio of the distance from the cooling passage to the rear edge and the wall thickness of rear edge of the blade is 2 or less.

Since applicant has not disclosed that having the ratio of the distance from the cooling passage to the rear edge and the wall thickness of rear edge of the blade is 2 or less solves any stated problem or is for any particular purpose above the fact that the blade profile reduces the flow velocity differential across the blade and it appears that the blade of Sato et al. as modified by AAPA and as further modified by Shizuya et al. would perform equally well with the ratio of the

distance from the cooling passage to the rear edge and the wall thickness of rear edge of the blade is 2 or less as claimed by applicant, it would have been an obvious matter of design choice to modify the blade of Sato et al. as modified by Shizuya et al. by utilizing the specific shape and dimensions as claimed for the purpose of reducing the flow velocity differential across the blade.

Therefore, it would have been an obvious matter of design choice to modify the turbine blade of Sato et al. as modified by AAPA and as further modified by Shizuya et al. to obtain the invention as specified in claim 4.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (4,626,174) in view of obvious design choice.

Sato et al., in figures 1, 2, 5, and 10-14, teach a blade 10, of a gas turbine, having a belly side 10b, a back side 10a, a front edge (not numbered), and a rear edge (not numbered), wherein diameters of circles inscribing the belly side 10b and the back side 10a of adjacent blades decrease gradually from the front edge to the rear edge.

Sato et al. do not disclose expressly a ratio of blade maximum wall thickness and blade chordal length is 0.15 or more, and a wedge angle of the rear edge is 10 degrees or less.

Since applicant has not disclosed that having a ratio of blade maximum wall thickness and blade chordal length is 0.15 or more, and a wedge angle of the rear edge is 10 degrees or less solves any stated problem or is for any particular purpose above the fact that the blade profile reduces the flow velocity differential across the blade and it appears that the blade of Sato et al. would

perform equally well with a shape and having the dimensions as claimed by applicant, it would have been an obvious matter of design choice to modify blade of Sato et al. by utilizing a ratio of blade maximum wall thickness and blade chordal length is 0.15 or more, and a wedge angle of the rear edge is 10 degrees or less as claimed for the purpose of reducing the flow velocity differential across the blade.

Therefore, it would have been an obvious matter of design choice to modify the turbine of Sato et al. to obtain the invention as specified in claim 2.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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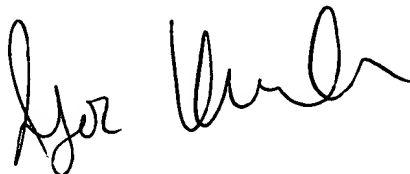
Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Kershteyn whose telephone number is (703) 308 8317. The examiner can be reached on Monday-Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look, can be reached on (703) 308 1044. The fax number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308 0861.

IK
December 8, 2003



Igor Kershteyn
Patent examiner.
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12/10/03